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Revision of *Pilargis* de Saint-Joseph, 1899 (Annelida, Polychaeta, Pilargidae)

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Abstract

Pilargis de Saint-Joseph, 1899 includes seven species and one subspecies: *P. berkeleyae* Monro, 1933, *P. maculata* Hartman, 1947, *P. modesta* Intes and le Loeuff, 1975, *P. mohri* Gallardo, 1968, *P. papillata* Rasmussen, 1973, *P. tardigrada* (Webster, 1879), *P. verrucosa* de Saint-Joseph, 1899, and *P. verrucosa pacifica* Uschakov, 1955. Two species (*P. verrucosa* and *P. berkeleyae*) have been recorded from widespread localities. However, no comparison with type material has been done, and there might be some different forms under the same name. We have reviewed all the available type material in order to clarify the taxonomy of this group. A critical analysis of morphological features and a standardization of their structure and variability have been attempted. Six species are redescribed, one species is characterized after published accounts, and one subspecies is elevated to species. Four are described as new: *Pilargis angeli* n. sp., *P. cholae* n. sp., *P. rozbaczyloi* n. sp., and *P. wolffi* n. sp. Three others based on damaged material are briefly characterized. A key for *Pilargis* species is included.

Keywords: Key, new species, taxonomy

Introduction

Pilargis de Saint-Joseph, 1899 with *Pilargis verrucosa* de Saint-Joseph, 1899, as the type species, was proposed in two different publications and in both cases a new family (Pilargidae) was established. The short publication (de Saint-Joseph 1899a) was the proposal of the family, the inclusion of *Phronia tardigrada* Webster, 1879, within it, as well as the definition of a new genus, *Pilargis*. The paper has a brief reference to the type species, *P. verrucosa*, and mentions the later publication. The second publication came a few months later and was a faunistic report on the polychaetes from Brest and Paimpol (de Saint-Joseph 1899b); besides some minor punctuation or redaction differences, family and genus diagnosis are identical. In the second paper, the species description is complete and illustrated, and the corresponding section in the paper finishes with a short explanation on the reasons to place both genera in a distinct family. However, the illustration does not give enough detail of the anterior end, and there was some confusion on the naming of its

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appendices, which were properly already cited for *P. tardigrada*. Further, in a short footnote, de Saint-Joseph (1899b, p 179) stated that *Phronia* should be replaced because it had been already used for a dipteran genus by Winnertz.

Fauvel (1920) redescribed *P. verrucosa* with some specimens from Arcachon; he clarified the anterior end details, provided better illustrations of the setae including furcate setae. However, Fauvel rejected Pilargidae as an independent family, and these characters and arguments were repeated in later publications, always linking it with Hesionidae (Fauvel 1923, 1925, 1934, 1936). This discussion on the non-independent position of Pilargidae returned some 70 years afterwards (Licher and Westheide 1994), but recent publications have shown that there are morphological and genetic grounds to reject the fusion of Hesionidae and Pilargidae (Pleijel and Dahlgren 1998; Dahlgren et al. 2000).

Pilargis is the type genus for the subfamily Pilarginae de Saint-Joseph, 1899, which includes pilargids with tapered bodies, integument with verrucae, and whose parapodia can be provided with notopodial hooks. An interesting character for this subfamily, as defined by Salazar-Vallejo (1987), but not included by him, is the presence of branching lateral gut diverticula that penetrate the parapodia. This was first detected in *Sigambra* by Müller (1858), and used in the generic diagnosis by Pettibone (1966), but have not been extensively employed, perhaps because its observation requires a transparent body wall or the need to make dissections of parapodia. These caeca can penetrate deeply into parapodial lobes (Figures 2C, D, 4A), as in *Pilargis*, and provide a larger digestive surface as well as an additional hydrostatic support. This would explain why the parapodia of the members of this subfamily can be massive and elongated, and, at the same time, can explain why the body looks laterally deeply-incised.

Members of *Pilargis* are not common; they have been found mostly in subtidal soft bottoms, and some species have been collected from mussel-beds. They are free-living, though one record by Britayev (1993) indicates that they can live in other polychaete tubes. However, since there is some confusion regarding some of the species, the assignment of these records to any species should be taken with reserve. For example, *Pilargis berkeleyae* Monro, 1933, was described from the Northeastern Pacific and has been recorded in many places all over the world (Blake 1994, p 280), including Japan, Chile (Cañete et al. 1990), the Gulf of Mexico (Wolf 1984), the Southwestern Atlantic Ocean (Salazar-Vallejo and Orensanz 1991), and Western Africa (Kirkegaard 1983). However, since there are several differences in the specimens that have been illustrated, in terms of abundance and size of verrucae, a clarification is necessary. At the same time, since the description of *Pilargis perezi* Charrier, 1924, and its fast rebuttal by Fauvel (1925), there is the perception that the morphology of these pilargids is both simple and variable; thus, by his influence, the potential description of different species has been halted. In this contribution, we have standardized the concepts for morphological and taxonomic features trying to increase our understanding of the variability of these pilargids. Thus, we revise type or non-type material and redescribe six species, characterize two others (*P. verrucosa pacifica* Uschakov, 1955 and *P. tardigrada* (Webster, 1879)), using the published accounts, with one subspecies being elevated in rank to species level. Four others are newly described, and we provide some characteristics for three additional apparently undescribed species.

Morphology

Adult specimens in *Pilargis* have medium to large size fusiform bodies with tapering, small anterior and posterior ends. The taxonomy in the genus has been difficult because of the

apparent homogeneity of the soft parts in the body, and because the variation in verrucae size and abundance are not well understood, or have been rejected as useful characters. After the analysis of several adults and juveniles in some species (see below), we think that species can be separated using several features as follows.

Body integument

de Saint-Joseph (1899a, b) regarded the body as covered by warts (*L. verruca*) and hence the name of the type species for his genus and family. Although they have also been called papillae, there are important differences between them. Verrucae are hardened outgrowths from the body wall (or at least from the cuticle), and they have been also called tubercles, especially in scale-worms; they may have a sensory or protective role. Papillae are rather soft outgrowths mostly with glandular roles. The only studies on verrucae are the short description and illustration by de Saint-Joseph (1899b, p 178, Plate 6, Figure 17) and the description by Pérès (1908); more detailed histological analysis were focused on flabelligerids (Jourdan 1887; Borodin 1929).

Verrucae can be abundant all over the body (Figures 1A, 7A), or more or less restricted to some body parts (Figures 5B, 8B), and in some species they are so tiny that the body looks smooth (Figures 5A, 8A); they can seldom be arranged in longitudinal series (Figure 10A), or irregularly placed. The size and form of individual verrucae can vary along the body, or they can be conservative and vary from species to species. Hartman (1947) used the difference in abundance of verrucae to separate species, but it was later implicitly rejected (Pettibone 1966). The first account on this variation was made by Katzmann et al. (1974); they found two different patterns in Mediterranean populations of *P. verrucosa* but disregarded them as useful to separate species, even though the illustrations of anterior ends and parapodia would indicate otherwise. There are no detailed studies on verrucal histology; the only illustration was made on *Pilargis mohri* Gallardo (1968, Plate 13, Figure 2). He drew a rounded verruca and thought there was a central pore, so they could have an excretory or sensory function. In fact, they are outgrowths of the body wall, provided with a thick layer of transparent cuticle, so they can hardly have any excretory function.

After the examination of the type of *Pilargis modesta* Intes and le Loeuff, 1975, it was noticed that there are consistent differences in the external cuticle outgrowth, since cuticle “tunnels” (see below) are present all over the body, although they take the typical verrucal shape only over parapodial lobes. The shape of the verrucae is mainly conical or mammilliform (Figures 3E, 7E, 9C, 10E), though they can be cylindrical or take an 8-shaped profile (Figure 11F), with the base slightly or considerably larger than the distal part. The verrucae on dorsal cirri may differ since they are distally expanded (Figure 9C), mostly flat, and sometimes have folds or wings (Figure 2A). In juveniles, these can also be present over the anterior end. The most relevant fact about verrucae is that being a hardened projection with a thick cuticle, they are not modified after preservation, and their relative shape, size, and abundance provide a useful feature to separate similar species.

Palps

These are massive blunt or truncate cones, often as wide as the whole prostomium. They can be completely fused (Figures 8A, 9A) or free to the base (Figure 1A); if there is a deep furrow between them, they can be regarded as free. They can be directed ventrally but this

may change by pharynx eversion; palpostyles are always small, sometimes slightly larger than surrounding verrucae, and can be placed towards the inner margin or by the center of the palp. Palps are biarticulate, although palpostyles may be tiny and difficult to detect among large verrucae, or eroded during sample treatment, so a careful ventral or frontal examination is often required to detect them.

Lateral antennae

There are two simple lateral antennae, usually shorter than palps. They may arise from lateral ridges or can be placed at about the same level as the middle of the prostomium, extending along different proportions of palp length. This insertion is easily noticed by observing the anterior reach of the antennae, so they can be anterior if they reach the palp tip (Figure 11A), or median if they remain shorter than palps (Figure 7A). The relative length and position become fixed early in ontogeny since juveniles (see *P. verrucosa* below) show a similar pattern in position and size proportions.

Tentacular segment

The tentacular segment carries two pairs of tentacular cirri. It is anteriorly reduced, leaving some room for a mid-dorsal nuchal area. Fauvel (1920) regarded it as a brain lobe, but it has not been detailed afterwards; in his drawings, its position and elevation resemble the sensory lobe that is present in other polychaete families (e.g. Amphinomidae), but this could be an artifact of contraction. The tentacular cirri are placed slightly differently; the dorsal cirri are placed slightly ahead of the ventral ones so, even though they are of about the same size, the dorsal may look longer.

First setiger

There may be some differences in the size relationship of the first dorsal cirri, in relation to tentacular cirri, and to dorsal cirri in following setigers. Thus, they are always larger than tentacular cirri and can be larger, about the same size, or smaller than those present in following setigers.

Parapodia

Parapodia are swollen, massive lobes with little muscular development. They are hollow and enteric caeca penetrate deeply into them (Figure 8F). Parapodia have dorsal cirri, neurosetal lobes with setae, and ventral cirri. Dorsal cirri can be separated in most species very easily into cirrophore and cirrostyles; the size relationships between them can be useful, but since their proportions may change throughout the body, anterior and posterior parapodia must be observed. The cirrophores can be massive, much wider than the cirrostyles (Figure 5C, D), glandular and colored, while the cirrostyles can be as wide as the cirrophore (Figures 1C, 14E) or much narrower. The parapodial lobe may show some folding along its external wall; the pattern of folds, either transversal or longitudinal, may indicate the degree of wall thickness or amount of muscle layers in it. The ventral cirri can extend beyond the setal lobe (without setae), no matter how contracted the setal lobe is, or it can be shorter than it. However, since the setal lobe is employed for walking, it has a large amount of muscles, and its appearance can vary depending on its contraction degree. In

comparison, parapodial cirri are not so contractile and its shape is more conservative and useful for taxonomic purposes.

Parapodial glands

Glands are present in dorsal cirri, and sometimes over the ventral surface of the parapodia and body wall as well. Their arrangement can be concentrated on the dorsal (often anterior) surface of the cirrophore (Figure 8C, D), or they can be placed more deeply into the dermis. Further, there might be smaller glands on the ventral surface of the parapodial lobe (Figure 13C, D). These glands have spherical or polyhedral gland cells, often dark colored. Sometimes, pigment may fade but the structure can be detected in the compound microscope, and could be seen more easily using methyl-green staining (Winsnes 1985). The gland area is rather small in juveniles but becomes larger through development; however, its relative position is conservative, making it a useful character to separate species. In the dorsal cirrostyle, the glands can be rounded or club-shaped, much less pigmented than other glands.

Neurosetae

The brittle setae can be capillaries or limbates. The former are cylindrical, smooth and can be long and distally curved, while the latter are basally cylindrical and distally limbate, straight or curved, sometimes twisted over itself, looking like a pseudocompound setae (Figure 10C). The distal region is not cylindrical; it is a triangular prism, and the cutting edge can be finely spinulose or clearly denticulated (Figure 18E). Some species have distally curved neurosetae, sometimes with a larger distal denticle, making the setae appear bidentate. These details have been illustrated for some species since Hartman (1947), and have been recently studied by scanning electron microscopy (Cañete et al. 1990), indicating that the main tooth is not spoon-shaped, and the distal denticle is not shovel-shaped, as has been shown before (Hartman 1947). The relative exposure of setae should be taken into account; if the distal prismatic portion is the only one exposed, then the setae could appear short, completely limbate, and either spinulose or denticulate. These features would be less eroded and more easily seen in shorter setae; longer setae would appear medially limbate, and in larger organisms, setae would look subdistally limbate when fully exposed. Further, setal tips erode or adsorb foreign materials very easily, and their fine denticles or limb spines are fragile, and they can be easily eroded or covered by adsorbed materials too, making its detection more difficult. Therefore, neurosetae should be called either straight or curved limbate capillaries; however, because they are very brittle and easily adsorb foreign materials, their use should be de-emphasized in separating species in the genus. The furcate setae reported found by Fauvel (1920, repeated: 1923, 1934, 1936), were not seen by Katzmann et al. (1974), nor by us. They are not present in the genus.

Posterior end

Although members of *Pilargis* fragment easily, the posterior end may provide some useful taxonomic characters. The number of prepygidial asetigers would be of minor importance. The pygidium may be swollen as an anal bulb, can be as wide as the preceding body section, or could be smoothly tapered, and these character states are shown in the same species, depending on the development or state of regeneration. Anal cirri can be present or

absent, although sometimes some large verrucae could be confused with short anal cirri. To be regarded as true anal cirri, they should be at least twice as long as surrounding verrucae. However, in some specimens of the same species, some had pygidium with cirri while others lacked them (Figure 12B–D); thus, we should de-emphasize their use as a distinguishing feature.

Brain lobes

The brain shape of pilargids was employed by Fitzhugh and Wolf (1990). They found that it has a pair of large posterior lobes, often darkly colored, that can project over setigers 1–2. They regarded a pair of lateral dark glands as nuchal organs and one pair of depressions in the postectal corners of the prostomium were referred to as nuchal slits. As will be shown below, there could be other dark internal masses, especially in the tentacular segment. Since they did not find any cilia in nuchal organs or slits, their proposal to name these structures should be regarded as tentative. There can be differences in the size and pigmentation degree of the brain posterior lobes and they could be used to separate similar species, though pigment fades off rather easily. The posterior lobes can be globose or fusiform, and can be parallel to the main body axis or have an oblique orientation, and they can be colorless (Figures 2A, C, 4A, 14A) or variously pigmented (Figures 7A, 8A, 11A, 12A).

Institutions

Institutions, organizations and museums are indicated as follows: BMNH (The Natural History Museum, London), ECOSUR (Colección de Referencia, El Colegio de la Frontera Sur, Chetumal, México), LACNHM (Natural History Museum of Los Angeles County, Allan Hancock Foundation Polychaete Collection), MNHN (Museum National d'Histoire Naturelle, Paris), SMF (Senckenberg Museum, Frankfurt), SSUC (Colección de Flora y Fauna Prof. Patricio Sánchez Reyes, Pontificia Universidad Católica de Chile, Santiago), UANL (Laboratorio de Biosistemática, Facultad de Ciencias Biológicas, Universidad Autónoma de Nuevo León, Monterrey, México), USNM (National Museum of Natural History, Smithsonian Institution, Washington, DC), ZMUB (Zoological Museum, University of Bergen), and ZMUC (Zoological Museum, University of Copenhagen).

Results

Systematics

Class POLYCHAETA Grube, 1850

Order PHYLLODOCIDA Dales, 1962

Suborder NEREIDIFORMIA Glasby, 1993

Superfamily NEREIDOIDEA Johnston, 1845

Family PILARGIDAE de Saint-Joseph, 1899

Subfamily PILARGINAE de Saint-Joseph, 1899

Pilargis de Saint-Joseph, 1899

Pilargis de Saint-Joseph 1899a, p 42, 1899b, p 175; Fauvel 1920, p 212; Horst 1921, p 74; Hartman 1947, p 490–491; Uschakov 1965, p 179; Pettibone 1966, p 160–161 (syn.); Blake 1994, p 279–280.

Phronia Webster 1879, p 268.

Type species. Pilargis verrucosa de Saint-Joseph, 1899, by original designation.

Emended diagnosis

Pilarginae with large biarticulated palps, palpostyles minute, without ventral papilla. Paired lateral antenna present, no median antenna. Two pairs of tentacular cirri. Parapodia well-developed, notocirri enlarged, separated in cirrophore and cirrostyles (potential autopomorphy in the subfamily), sometimes reduced. Notosetae completely absent (autoapomorphy in the subfamily). Neurosetae capillaries smooth or slightly limbate, blade slightly spinulose or smooth, tips straight or curved (“bifid”). Pygidium with or without anal cirri. Pharynx globose, smooth. Intestine with lateral diverticula.

Phronia Webster, 1879, is a junior homonym of a dipteran genus (de Saint-Joseph 1899, p 179). These are the taxa currently included in *Pilargis* and their original region: *P. berkeleyae* Monro, 1933, from the Northeastern Pacific Ocean, *P. maculata* Hartman, 1947, from the Northeastern Pacific Ocean, *P. modesta* Intes and le Loeuff, 1975, from Western Africa, *P. mohri* Gallardo, 1968, from the Western Pacific Ocean, *P. papillata* Rasmussen, 1973, from the Northeastern Atlantic Ocean, *P. tardigrada* (Webster, 1879), from the Northwestern Atlantic Ocean, *P. verrucosa* de Saint-Joseph, 1899, from the Northeastern Atlantic Ocean (including *P. perezi* Charrier, 1924), *P. verrucosa pacifica* Uschakov, 1955, from the Northwestern Pacific Ocean, and *P. sp.* A Wolf, 1984, from the Western Atlantic Ocean.

Pilargis hamatus Hartman, 1960 and *P. matsunagaensis* Kitamori, 1960 were transferred to *Ancistroyllis* McIntosh, 1879 by Pettibone (1966); *P. mirasetis* Fauchald, 1972 has been transferred to a different genus (*Santelma* Blake, 1993) and family (Nautiliniellidae) by Blake (1993). Some records have not been included in the key below because there was no material available: Blake’s (1994, p 280) record of *P. berkeleyae* does not belong in that species, but its affinities are not settled; the records of *P. berkeleyae* by Britayev (1993), Buzhinskaja (1980), Buzhinskaja and Britayev (1994), and Imajima (1987), may belong to *P. pacifica* Uschakov, 1955 (see below).

The proposal of the subfamilies Synelminae and Sigambrinae was made by comparative morphology methods (Salazar-Vallejo 1987). However, it failed to follow the Principle of Coordination (International Commission on Zoological Nomenclature (ICZN) 1999, Art. 36), thus it was consequently modified by using Pilarginae instead of Sigambrinae by Salazar-Vallejo and Orensanz (1991). After the subfamilies proposal by Salazar-Vallejo (1987), there have been two independent evaluations of the intergeneric cladistic affinities in the Pilargidae. The first was by Fitzhugh and Wolf (1990), and the second by Licher and Westheide (1994), and despite their conclusions, the subfamilies are apparently well delineated in their cladograms.

Fitzhugh and Wolf (1990, p 16, Appendix 2) regarded three genera as lacking notopodial spines: *Loandalia* Monro, 1936, *Parandalia* Emerson and Fauchald, 1971, and *Pilargis*. However, as has been shown in several publications (Salazar-Vallejo 1987; Salazar-Vallejo and Orensanz 1991; Blake 1994), the former two do have notopodial spines, some species even have a few thin capillary setae along with them. Further, these two genera have been shown to be synonyms (Salazar-Vallejo 1998), so among the genera included by Fitzhugh and Wolf (1990), only *Pilargis* completely lacks notospines or notohooks. Further, *Synelmis* (= *Glyphohesione*) *klatti* was regarded as a member of the family (but it belongs elsewhere),

and if we understand the proposed subfamilies as represented by genera 1–6 for Pilarginae against 7–12 for Synelminae, they were grouped in two out of three trees (Fitzhugh and Wolf 1990, Figures 4, 5).

Licher and Westheide (1994, p 228, Table 1, p 232, Figure 4) indicated that two genera lack notopodia (although they probably meant notosetae): *Pilargis* and *Otopsis* Ditlevsen, 1917, and they differ especially because *Otopsis* has a smooth integument, median antenna, and its palps are regarded as simple, while in *Pilargis* integument is verrucose, median antenna is missing, and palps are biarticulated. Further, in their single cladogram, they found that *Glyphohesione* was basal and the two subfamilies are better delineated, since they found a single tree, with the sole exception of *Otopsis*, which was wrongly coded (see Licher and Westheide (1994, Figure 4, 19d) because they indicated lack of notopodia, but *Otopsis* only lacks notosetae, and has large dorsal cirri. These features bring it in close proximity to, and may eventually fall within *Pilargis*. Anyway, after Jenner (2002, 2004), there is a widespread problem in character definition and character coding, so we are still far from a robust conclusion or rejection of the subfamily groupings.

Regarding the differences between *Pilargis* and *Otopsis*, as will be shown below, there is a marked variation in the verrucal density or relative size, and in some species they are markedly reduced in size or body coverage (see below). The number of antennae has been rejected as a generic diagnostic feature by Pettibone (1966, p 164) for separating *Ancistargis* Jones, 1961 from *Ancistrostylis* McIntosh, 1879 (a contrasting view was briefly exposed by Emerson and Fauchald 1971, and by Licher and Westheide 1994, p 233) for *Litocorsa* Pearson, 1970. However, the median antenna in *Otopsis* is very large, at least in the type species (*O. longipes* Ditlevsen, 1917). Further, palpostyles may be very small and difficult to find, or they can be eroded, making any distinction of simple against biarticulate rather difficult to make. However, another species (*O. kurilensis* Uschakov, 1971) has a tiny median antenna and biarticulated palps, which indicates a much closer similarity with *Pilargis*. If we follow the same approach of disregarding the number of antennae as a distinguishing feature, then *Otopsis* might have to be included in *Pilargis* since no other feature separates them, as was indicated by Hartman (1947, p 483, footnote 1). This is an interesting question that will be addressed in a forthcoming contribution.

***Pilargis verrucosa* de Saint-Joseph, 1899**

(Figures 1–3)

Pilargis verrucosa de Saint-Joseph 1899a, p 42, 1899b, p 175–180, Plate 6, Figures 10–17;

Fauvel 1920, p 206–208, 212–213, Figure 1a–e; Charrier 1924, p 1–7, Figures 1–11;

Fauvel 1925, p 88–90.

Pilargis sp. Harmelin 1964, p 72, Plate 1, Figures 1–4.

Type material

Northeastern Atlantic Ocean: syntype (MNHN-A278fA) of *Pilargis verrucosa* de Saint-Joseph, 1899, coll. de Saint-Joseph, Brest (tags: collection number 20, 1911; “*Pilargis verrucosa* exemplaire femelle entier partie anterieur en 3 trançons près 5 segments ... Brest ... 1898”). Syntype (MNHN-A278fP) of *Pilargis verrucosa* de Saint-Joseph, 1899, coll. de Saint-Joseph, Brest, 1 April 1898 (tags: one like above, other with: “*Pilargis verrucosa* exemplaire femelle ... partie posterieur en 2 trançons, partie anterieur en 3 trançons, en 2 verres ... Brest”). Syntype (MNHN-A278m), same data as above (tag: “*Pilargis verrucosa*

exemplaire male incomplet en 2 tronçons, il manque un cirre tentaculaire pres 121 ou 140 segment pour ... Brest 1er Avril 1898”).

Additional materials

Complete specimen fixed in alcohol (MNHN-A71), colorless, bad condition, coll. M. Blanchard, no locality, id. *P. Fauvel* (pharynx everted, globose almost smooth, with some longitudinal thin striae, as long as the first three setigers). Complete specimen (MNHN-A437), coll. Cuénot, Arcachon, id. as *Pilargis verrucosa* (= *P. perezi* Charrier), legit Fauvel (very well preserved, gray, anterior end slightly compressed, posterior end in regeneration; 86 mm long, 4.5 mm wide, 138 setigers. Regenerating posterior end 8 mm long, 2 mm wide, 28 setigers, 15 asetigers), who used it for the redescription (Fauvel, 1920). Posterior fragment (MNHN-A409), coiled (82 mm long, 2.6 mm wide, 144 setigers, posterior end regenerating, 26 setigers, two to three asetigers, and pygidial bulb. This has a smooth basal section, distal rounded portion and ventrolateral anal cirri covered by verrucae). Median fragment (MNHN-A491) *idem* (ca. 50 mm long, 3.5 mm wide, ca. 180 setigers; dark gray, slightly dehydrated. Three parapodia removed; neurosetae partly broken or covered with adsorbed material, tip slightly curved bidentate). One complete, splendid male (MNHN-A494), id. as *P. verrucosa*, Ourse de Kersos, Concarneau, 11 June 1965 (160 mm long, 3.5 mm wide, ca. 300 setigers, 210 setigers and posterior section with ca. 90 setigers; posterior end with two to three asetigers, a smooth tapering anal plate, two ventrolateral anal cirri, abundant large verrucae, especially dorsally. Anal cirri 10 times longer than anal verrucae). Mediterranean Sea: One complete juvenile and a small specimen regenerating the posterior end (ECOSUR), coll. F. Pleijel and A. Mackie, Cap Oullestrel, Banyuls-sur-mer, 7 October 1991, muddy bottoms, 40 m, legit F. Pleijel. One complete juvenile (SMF-11214/1), coll. *Meteor* 25th cruise, Levantin Basin, Stat. 35KG1.

Redescription

Since the original description and Fauvel's redescription are good, a few comments will be added on the type material.

Female syntype (A278fA). Three fragments, pale, anterior one 12 mm long, 3.5 mm wide, 39 setigers; median large portion 10 mm long, 3.2 mm wide, 27 setigers; short median portion 3 mm long, 3 mm wide, four setigers. First dorsal cirri larger than the one of setiger 2 (Figure 1A); dorsal cirri much larger than ventral one, 1.5–2.0 times longer and 2–5 times wider, can be separated in cirrophore and cirrostyles, about equal-sized but cirrophore much wider (Figure 1C, D). No posterior end available; larger verrucae conical or mammiliform, those present on dorsal cirrostyles, ventral cirri, and ventral surface low cylindrical; once cleaned, none has any filament through the transparent integument, as was depicted in the original Figure 17. Bifid setae could not be confirmed because of the amount of adsorbed salt over them; this has already been noticed by Fauvel (1925, p 90).

Female syntype (A278fP). Two fragments, both pale, one median 18 mm long, 3.6 mm wide, 38 setigers, a posterior larger fragment 62 mm long, 3.5 mm wide, 102 setigers. Posterior end (examined using methyl green staining) without anal cirri (Figure 1B); correctly described as lacking anal cirri. Eggs large, about 240 µm.

Figure 1. *Pilargis verrucosa* de Saint-Joseph, syntype MNHN-A278, female. (A) Anterior end in dorsal view; (B) posterior end in ventral view; (C) median setiger in anterior view; (D) posterior setiger in anterior view. Scale bars: 500 μ m (A, B); 270 μ m (C, D).

Male syntype (A278m). Two fragments, pale, anterior one 44 mm long, 4 mm wide, 124 setigers; median portion 18 mm long, 4 mm wide, 18 setigers. Both partly dehydrated, show a deep ventral furrow, stiff; anterior fragment previously dissected ventro-longitudinally, from slightly after the mouth to setiger 42, but blade went through both body walls, several parapodia removed. Some neurosetae free of adsorbed materials, smooth limbate capillaries distally curved, a main and an accessory tooth. The difference that de Saint-Joseph noticed between male and female was probably due to the different degree of dehydration, which changes the general body appearance and the relative proportions of the parapodia. Larger verrucae over middorsal and parapodial base areas, though the whole dorsum is covered by verrucae. Sperm abundant in coelom, head globose, about 3 μ m long.

Juveniles. Complete specimen (ECOSUR), 9.5 mm long, 0.4 mm wide, without any median expansion, 52 setigers, four asetigers. Integument with sparse verrucae, except in the anterior end. Body with a series of glandular masses dorsally and ventrally in parapodial bases, in setigers 3–35 about the same size, pigmentation fading towards setiger 30,

Figure 2. *Pilargis verrucosa* de Saint-Joseph, juveniles. (A, B): ECOSUR (unnumbered): (A) anterior end in dorsal view, verrucae mostly omitted (inserts: close-up of some verrucae); (B) posterior end in ventral view. (C, D) SMF-11214/1: (C) anterior end in dorsal view, most verrucae omitted; (D) posterior end in dorsal view. Scale bars: 125 μ m (A, C, D); 112 μ m (B).

disappear in setiger 35, reappear only in setiger 43; they disappear in the posterior region, although there is a dark lateral gland in the pygidial bulb.

Prostomium with biarticulated palps, palpostyles central directed forward; lateral antennae inserted on the base of the palps, slightly pass prostomial margin but not palp tips (Figure 2A). Tentacular segment projected forwards; tentacular cirri with verrucae, dorsal one slightly larger than ventral one. First setiger with dorsal cirri larger than dorsal tentacular cirri and dorsal cirri on setiger 2. Ventral cirri longer than setal lobe. Parapodia with acuminate cirri, dorsal cirri larger than ventral one, both larger than setal lobe.

Posterior end with four asetigers, pygidial bulb with abundant verrucae, from its medial portion towards the posterior margin, two ventrolateral cirri, over 10 times the size of adjacent verrucae (Figure 2B). Most verrucae over anterior end and over parapodial cirri are not flat; rather bifid or trifid, tend to be regularly placed over the body; three ones over lateral margins of tentacular segment, two to three over dorsal cirrostyles and one subdistal in ventral cirri (Figure 2A, insert). Brain elongated, posteriorly bilobed, reaches about the middle of second setiger. Gut straight; lateral diverticula not seen.

Another juvenile (SMF) completely transparent (Figure 2C, D); two large dorsal ovoid dark gland masses from setiger 3, and two other ones over the ventral surface, continue towards some five setigers before pygidium, giving the specimen a distinct spotted regular pattern. Tentacular cirri directed anterolaterally, first dorsal cirri about the same size as second setiger ones. Posterior end with two asetigers, short pygidial bulb, two lateral anal cirri, all with large verrucae. Gut diverticula from setiger 1.

Variability

The insertion of the lateral antennae, as well as size relationships between anterior end cirri, are consistent since they become fixed in small specimens. However, the abundance and shape of verrucae differ from larger specimens; dorsal verrucae shape differs, and those present over cirri tend to be smaller in larger specimens. A comparison of parapodial development in different organisms is shown in Figure 3; cirri are always more or less globose, blunt, and dorsal larger than ventral ones. Dorsal verrucae are always larger (Figure 3B–F), inverted cone- or dune-shaped (Figure 3E, insert), than those placed over the cirrostyles; these are often distally expanded (Figure 3F, insert), and arranged in a single longitudinal line over the cirrostyles.

The dark glandular material is present just before the dorsal cirrophore (Figure 2A, C) and disappears in larger specimens; first appearing as small globular structures and later they cannot be seen again. Likewise, body outline changes a lot since the juvenile is almost cylindrical or slightly tapered towards both ends, while the adult is markedly wider in the median region than towards any end. The posterior end is rather variable although the basic structure is more or less retained, the anal cirri might regenerate and the swelling of the pygidial bulb (Figure 3A) may change with contraction. Gut diverticula are seen in every setiger in juveniles (Figure 2C) and continue to the last prepygidial setiger (Figure 2D).

Fauvel incorrectly stated that verrucae are restricted to the dorsal side of dorsal cirri, since they are present, though smaller, over the ventral parapodia surface. Anterior end lacks the caruncle that Fauvel had noticed; it has a rather smooth surface without large verrucae. Further, the posterior brain lobes are slightly darker, placed inside setiger 1, and somewhat fusiform pointing anterolaterally. Posterior end as a pygidial bulb heavily covered by large truncate verrucae, but may lack anal cirri; neurosetae masked by adsorpted materials but a few of them show an almost smooth limbus and a distally curved bifid tip, as was illustrated for it.

Figure 3. *Pilargis verrucosa* de Saint-Joseph. (A–D) MNHN-A437 Arcachon: (A) posterior end in ventral view; (B) right setiger 25 in anterior view; (C) right setiger 50 in anterior view; (D) right setiger 108 in anterior view. (E, F) MNHN-A71: (E) anterior setiger (insert: side view of a verruca on cirrophore); (F) posterior setiger (insert: side view of a verruca on cirrostyles). Scale bars: 450 μ m (A, F); 600 μ m (B–D); 300 μ m (E).

Discussion

Pilargis verrucosa has no sexual dimorphism, as has been already stated by Katzmann et al. (1974, p 21); however, it includes two different morphs in the Bay of Biscay, depending on the abundance and size of verrucae: the typical morph has abundant large verrucae over the back and parapodia, and the atypical morph has few and smaller verrucae. There are other differences in the anterior end and parapodial cirri; however, since sampling depth was not recorded, this variation remains unexplained. Therefore, those morphs with few verrucae are herein regarded as members of *P. modesta* Intes and le Loeuff, 1975, which is a southern species; it seems that these latter authors did not include the paper by Katzmann et al. (1974) because it was in press.

Distribution

France, Iberian Peninsula and Mediterranean Sea, in 2–300 m depth.

***Pilargis angeli* n. sp.**
(Figure 4A–D)

Type material

Eastern Tropical Pacific Ocean: holotype (UANL-1474) and two median fragments (UANL-1474a), coll. J. A. de León-González, off Western coast of Baja California Sur, Cruise H-2, 9 March 1990.

Description

Holotype an anterior fragment, slightly damaged, 13 mm long, 2 mm wide, 69 setigers; longest median fragment 15 mm long, 2 mm wide, 69 setigers; shortest fragment 10 mm long, 2.2 mm wide, 38 setigers. Integument rugose, verrucae sparse, minute, concentrated on anterior end and dorsal cirri.

Prostomium fused with peristomium; palps biarticulate, palpostyles tiny rounded, directed ventrally. Antennae globose, smooth, rising from low protuberances on the base of palps, reaching the anterior margin of palps. Tentacular cirri cirriform, dorsal ones 1.2 times longer and 1.5 times wider than the ventral, those on the right side incomplete, the ventral is missing (Figure 4A).

First setiger with dorsal cirri longer than tentacular cirri, longer than following cirri. Anterior parapodia (Figure 4B) with some verrucae over the back and cirrostyles; dorsal cirrophore thick, globose; no traces of large glandular areas in the middle of the cirrophore nor epidermal glands, but a diffuse spotted pattern of glands in parapodia of median fragments. Ventral cirri elongate, about one-third as long as dorsal cirri; dorsal cirrostyles cirriform, very long, some with a distal swelling, 1.2–1.5 times cirrophore length. Median and posterior parapodia similar (Figure 4C–D), without verrucae; ventral cirri shorter, cirriform, longer than setal lobe.

Most neurosetae limbate, limbus denticulate, distally unidentate, straight, tend to curl distally; longer in the superior than in the inferior portion of setal bundle. Some superior setae smooth capillaries. Pygidium unknown. Brain posterior lobes reach setiger 1. Pharynx not everted; gut diverticula start in setiger 2.

Discussion

Pilargis angeli n. sp. is very similar to *P. tardigrada* (Webster); they differ because the first have verrucae on its anterior end, while the second has verrucae restricted to parapodial lobes. Further, the size of cirrostyles is different, being very long in *P. angeli* n. sp., and conical and shorter in *P. tardigrada*.

Etymology

This species is named after our colleague J. Angel de León-Gonzalez, who has been working a lot on Eastern Pacific polychaetes in general, and who provided us with the type material for this species.

Type locality

Off the Western coast of Baja California Sur, México.

Pilargis sp. California, juvenile
(Figure 4E)

Material examined

Eastern Pacific Ocean: one specimen (LACMNH), collected during the Southern California Bureau of Land Management Study, accession number 85401, code BF1, no further data.

Description

Specimen complete, body folded, transparent, pale; slightly pigmented prostomium, pharynx and gut contents, 4.5 mm long, 2 mm wide, 22 setigers and eight asetigers. Integument rugose but without verrucae (Figure 4E).

Prostomium dorsally distinct from peristomium, not embraced by the peristomium, about twice as long as peristomium; palps rounded, massive, palpostyles elongated. Antennae cirriform rising from posterior margin of prostomium; few dorsal eyespots slightly ahead of antennae, arranged in two lateral and one median groups. Tentacular cirri cirriform, dorsal tentacular cirri about as long and wide as ventral tentacular cirri.

Parapodia elongated. First dorsal cirri as long as second dorsal cirri. Dorsal cirrophore elongated truncate cone, no glandular material visible either on the surface or below the integument. No pigment spots over ventral parapodial lobe. Dorsal cirrostyles digitate, elongated, no distinction observable from cirrophore. Ventral cirri cirriform, elongated, longer than setal lobe, about as long as dorsal cirri. Neurosetae include very long capillaries and smaller finely spinulose bidentates.

Pygidium rounded, two conical, ventrolateral anal cirri, as long as last three to four asetigers. Pharynx conical, wider anteriorly, as long as first three setigers. Gut diverticula penetrate about half parapodial lobe in setigers 1–9; from setiger 10, diverticula not yet formed; gut empty but in posterior region with fine particles and sediments.

Discussion

By the presence of elongated capillary setae and by the incomplete development of the gut diverticula and posterior end, this form is an early juvenile or a just settled postlarva.

Whether it belongs to other species in the region like *P. berkeleyae* or *P. maculata* (see below) is difficult to say, because there is no glandular development. However, because of the long dorsal cirrophore, it may be conspecific with *P. angeli* n. sp., but the setae differ.

Figure 4. (A–D) *Pilargis angeli* n. sp. UANL-1474: (A) anterior end in dorsal view (verrucae are mostly restricted to parapodia); (B) right setiger 10 in anterior view; (C) median setiger in anterior view; (D) right setiger 60 in anterior view. (E) *Pilargis* sp. juvenile BLM 85401 BF1, complete organism in dorsal view, slightly distorted by cover slip. Scale bars: 225 μm (A); 120 μm (B–D); 500 μm (E).

There are no other records of juvenile or postlarval *Pilargis*, and the few records available are on *Ancistrostylis* (Bhaud 1974; Blake 1975); it is interesting that this juvenile has antennae placed towards the posterior end of the prostomium; they could migrate anteriorly as the peristomium grows more laterally and fuses with the prostomium. Tentacular cirri and parapodial cirri are little specialized too, they undertake differential growth since in adults, dorsal tentacular cirri is longer than ventral one, dorsal cirri of first setiger becomes larger than those present in setiger 2, and ventral cirri is smaller than dorsal cirri. More and better materials would help in solving its affinity or specific placement.

***Pilargis berkeleyae* Monro, 1933**

(Figures 5A–E, 6A–C)

Pilargis berkeleyi (sic) Monro 1933, p 673–675, Figures 1–4; Hartman 1947, p 491–494,

Plate 59, Figures 1–8; Hartman 1968, p 383–384, 5 figures.

Pilargis berkeleyae Pettibone 1966, p 161–164, Figures 1, 2 (*partim*, non Figure 2a, b).

Type material

Eastern Pacific Ocean: holotype (BMNH 1933.1.14.1), Friday Harbor, Washington, coll. E. Berkeley. Non-type mature female collected in the same locality and by the same person (LACNHM-1714). Two juveniles (LAMNH-3492), Velero IV, Stat. 3492 (33°54'30"N, 118°29'11"W), 26 fathoms, black mud, 15 September 1955.

Redescription

Holotype an anterior fragment, dissected posteriorly; 19 mm long (excluding the everted pharynx), 2 mm wide about setiger 20, 57 setigers. Body pale; dark brown pigmented glands on dorsal cirrophore, starting in setiger 3 on the right, 4 on the left. Two large lateral dark glands behind the insertion of tentacular cirri (eyes?). Body verrucae sparse, small, mainly on anterior end and parapodial lobes (Figure 5A).

Prostomium fused with peristomium; palps globose, palpostyles tiny. Antennae cirriform, placed dorsally on the basis of palps. Peristomium 1.3 times longer than first setiger. Tentacular cirri cirriform, as wide as dorsal cirri of setiger 1.

First setiger with dorsal cirri about twice as long as dorsal tentacular cirri (Figure 5B). Dorsal cirri of setiger 1 three times as long as second dorsal cirri; right second dorsal cirri missing. All parapodia with dorsal cirrophore globose; anterior setigers with few small dark glands (Figure 5C), concentrated under the epidermis. Median parapodia with cirrophore turgent, thick, with dark glandular area completely filling the cirrophore. Posterior parapodia with gland mass perimeter less heavily pigmented (Figure 5D); glandular material concentrated slightly below the insertion of cirrostyles. No additional pigmented materials visible. Dorsal cirrostyles thick, digitate, about one-third to one-fourth as long as cirrophore. Ventral cirri thin, cirriform, can be as long as acicular lobe in anterior setigers; in most cases not surpassing the acicular lobe. Superior neurosetae mostly smooth capillaries, inferior bundle setae limbate, finely spinulose, distally bifid.

Pharynx everted, globose, transparent, broken in three sectors; it has two lobes clearly separated from the inside. Right setiger 8 has been previously removed; lumen can be seen from the outside; gut diverticula may start some setigers before it. Non-type mature female (LACNHM-1714) with eggs in median and posterior parapodia from setiger 240, one to three large eggs (200 µm each) per parapodium, others in coelom, spread out after parapodial removal.

Figure 5. *Pilargis berkeleyae* Monro, holotype BMNH-1933.1.14.1. (A) Anterior end in dorsal view (body laterally distorted); (B) same, close-up; (C) right setiger 22 in posterior view; (D) right setiger 46 in posterior view; (E) dorsal view of setigers 41–44. Scale bars: 380 μ m (A); 200 μ m (B); 270 μ m (C, D); 700 μ m (E).

Variation

Non-type specimen is a very large anterior fragment of a mature female, 170 mm long, 2 mm wide at setiger 20, 482 setigers. In spite of its large size, the glandular portion over anterior surface of dorsal cirrophore is small, and the integument is rough, with sparse small verrucae, concentrated over the anterior end and cirrostyles. Parapodia very

corrugated with longitudinal and transverse streaks (Figure 5E). Dorsal cirrophore well developed, not clearly cut from parapodial lobe, few spherical glands inside it, without pigmentation; cirrostyles digitate, 1.5 times longer than wide, with few verrucae concentrated over its dorsal surface. Ventral cirri directed laterally, digitate, two to three times longer than wide, surpassing setal lobe. Neurosetae long smooth capillaries and limbates finely spinulose, bidentate. Everted pharynx broken, no internal septum was seen.

One juvenile with large globose structures in anterior segments (Figure 6A), could be yolk granules and, if so, indicative of a lecitotrophic development. Besides pigmented glandular areas in dorsal cirrophore, many dark granules irregularly placed over the back (Figure 6B), while ventral surface has black spots restricted to parapodial bases (Figure 6C).

Discussion

The relative size and abundance of verrucae do not change with sexual maturity. Further, the development and position of the glands over the parapodia are very consistent and useful characters; thus the more closely allied Californian species, *P. berkeleyae* Monro, 1933 and *P. maculata*, cannot be separated using verrucae abundance but they can more easily be identified using the pattern of glandular development on parapodia. The former has glands that extend over the cirrophore, occupying from the subsurface to the inner portion of the cirrophore, while the latter has glands more or less restricted to the anterior surface of parapodial lobes, and they are rather superficial. The record by Imajima (1987, p 162) may not belong to this species because of the presence of abundant large verrucae (see Imajima 1987, Figure 7), and the insertion of those illustrations by Blake (1994) might promote confusion. Further, the record of a commensal worm in *Chaetopterus* tubes (Britayev 1993), implies a species different from that found by Imajima, judging by the size and abundance of verrucae (seen in his figures). They should be compared with *P. pacifica* Uschakov, 1955, originally described from Northern Japan Sea.

Distribution

Described from Friday Harbor, Washington, it has been documented as far south as Southern California. Other records are questionable because of the confusion regarding the development of dorsal verrucae, and glandular patterns in dorsal cirrophores.

Figure 6. *Pilargis berkeleyae* Monro, juveniles LACNHM (unnumbered). (A) Anterior end in dorsal view (glandular areas dotted on parapodia); (B) median segments (108–113) in dorsal view; (C) same, ventral view showing parapodial dark glands. Scale bars: 350 μ m (A); 400 μ m (B); 300 μ m (C).

***Pilargis cholae* n. sp.**

(Figure 7)

Pilargis berkeleyae Wolf 1984, p 29.26–29.28, Figures 29.23–29.24 (*non* Monro, 1933).*Type material*

Gulf of Mexico: Florida, USA: one anterior fragment, holotype (USNM-86958), off Panama City, Florida (29°54'59"N, 86°04'59"W), Stat. V-2528, September 1977, 37 m. One complete organism, paratype (USNM-86959), off Cape Sable, Florida (25°17'11"N, 83°02'04"W), Stat. 22B, April 1981, 53 m (8 mm long, 1 mm wide, 79 setigers and three asetigers; anterior end is markedly bent over its ventral surface and was left under the coverslip for a long time making it very flattened and difficult to handle).

Additional material

Northwestern Caribbean Sea: Laguna Nichupté, Cancun, Quintana Roo, México: paratypes, all twisted: one large specimen (ECOSUR), Stat. E5M5, 28 October 1987; one large specimen (ECOSUR), Stat. E6M2, 28 October 1987; one large specimen broken in two portions (ECOSUR), Stat. E7M4, 22 April 1988; three specimens slightly damaged (LACNHM), Stat. E5M7, 28 April 1987.

Description

Holotype anterior fragment, 25 mm long, 1.8 mm wide, 101 setigers. Verrucae very conspicuous, large capitate ones dorsally, smaller ones ventrally, the latter especially in the anterior region; posterior region almost smooth.

Prostomium completely fused to peristomium; palps biarticulated, damaged. Lateral antennae small, hardly seen because of abundant verrucae, observed in a ventral view of paratype; palps slightly damaged (Figure 7A). Two pairs of tentacular cirri, both directed anteriorly, covered with small verrucae.

Parapodia with large fusiform dorsal cirri, abundant large verrucae over the back, smaller ones over the tiny cirrostyles. First setiger with dorsal cirri larger than the one of setiger 2. Anterior parapodia (Figure 7C) with large fusiform dorsal cirri, 1.3 times longer than ventral cirri, about four times wider; ventral surface with rounded verrucae, about one-fifth as large as the largest dorsal verrucae. Median and posterior parapodia with larger dorsal cirri (Figure 7D, E), about two times as long as ventral cirri, four to five times wider. Ventral surface with tiny verrucae or smooth. Neurosetae include smooth capillaries and limbates, finely spinulose, very slightly bent distally, bidentate.

Posterior end (seen in paratype) with a pygidial bulb, as long as last two asetigers, distally covered by verrucae, in an expansion that projects from a short smooth neck-like portion; two lateroventral anal cirri, right one duplicate, all covered by verrucae (Figure 7B). Brain posterior lobes with heavy pigmentation, slightly pass first setiger. Other pigmented masses placed in bases of left parapodium 1, and tentacular cirri.

Discussion

Pilargis cholae n. sp. differs from *P. berkeleyae* by having abundant large verrucae dorsally, and by lacking any large glandular region in the cirrophore. It rather resembles *P. verrucosa*,

but cirri development is very different, being massive in *P. verrucosa* and more elongate, especially the ventral cirri, in *P. cholae* n. sp. It differs from *P. papillata* by lacking 8-shaped verrucae, especially on the base of dorsal cirri. The description by Wolf (1984) is accurate, except that the anal cirri were indicated shorter than what they are.

Figure 7. *Pilargis cholae* n. sp., holotype USNM-86958. (A) Anterior end in dorsal view; (B) posterior end in ventral view; (C) right setiger 12 in anterior view; (D) right setiger 90 in anterior view; (E) last right setiger in anterior view (insert: enlargement of a verruca). Scale bars: 225 μ m (A); 112 μ m (B); 112 μ m (C–E).

Etymology

This species is named after M. Soledad Jiménez-Cueto, a former colleague who sampled and processed the material on which this description is mainly based. The specific name is formed after her nickname.

Type locality

Off Panama City, Western coast of Florida, Gulf of Mexico.

Distribution

Restricted to two localities in Western Florida, in soft bottoms in 37–53 m depth, and in shallow (0–1.5 m) seagrass (*Thalassia testudinum*) beds, Laguna Nichupte, Quintana Roo, México.

***Pilargis maculata* Hartman, 1947**
(Figure 8A–F)

Pilargis maculata Hartman 1947, p 494–496, Plate 60, Figures 1–5; Hartman 1968, p 385–386, 4 figures; Blake 1994, p 282–283, Figure 10.5.

Type material

Eastern Pacific Ocean: California, USA: lectotype (LACNHM-148) and paralectotype (LACNHM-147), all collected in Moss Beach, Marine View, San Mateo County, low intertidal, in crevice of sandstone, July 1933, coll. D. Hammond (148 with four fragments, two anterior ones; larger selected as lectotype; smaller anterior fragment 2 mm long, 0.9 mm wide in last setiger, 13 setigers; larger median fragment 44 mm long, 1 mm wide around its middle, ca. 195 setigers; some segments with a large egg in ventro-posterior space in the segment; a smaller fragment 8 mm long, 0.9 mm wide about its middle, 40 setigers. Paralectotype is a posterior and a median fragment, probably coming from different specimens, because they differ in their condition.

Redescription

Lectotype (LACNHM-148) anterior fragment twisted, 7 mm long, 0.7 mm wide at setiger 20, 50 setigers. Body pale, large, dark; dorsal cirri with pigmented glands, smaller dark glands on ventral surface of parapodial base. Verrucae sparse, minute, concentrated on anterior end, especially over palps and antennae; dorsal cirri with few verrucae (Figure 8A).

Prostomium fused dorsally with peristomium. Palps biarticulated; antennae rise from lateral elevations, at the base of palps, almost reach anterior margin of palps (Figure 8B). Dorsal tentacular cirri thicker, longer than ventral ones; subspherical gland close to the base of ventral tentacular cirri.

First setiger with dorsal cirri about as long as dorsal tentacular cirri, two times longer than dorsal cirri of second setiger. Parapodia with few contraction lines, short cirrophore and cirrostyles; dorsal cirrophore truncated. Pigmented dark glands below integument, arranged in an oblique elliptical area, concentrated over anterior surface of cirrophore (Figure 8C), starting from setiger 1 or 2; first as few glands, in following setigers

individual size enlarges and increase their number. Dorsal cirrostyles digitate, about half the length of cirrophore (Figure 8D). Ventral cirri cirriform, smaller than acicular lobe. Ventral dark small glands, one or two per parapodium, are placed towards the parapodial base.

Figure 8. *Pilargis maculata* Hartman, lectotype LACNHM 148. (A) Anterior end in dorsal view; (B) same, enlarged; (C) median segments (41–44) in dorsal view; (D) left setiger 45 in anterior view; (E) neurosetae; (F) schematic cross-section of a parapodium showing gut diverticula separated in upper and lower sacs. Scale bars: 250 μ m (A–C); 203 μ m (D); 33 μ m (E).

Most setae broken; setae include superior large, inferior smaller, bidentate laterally spinulose capillaries. Sometimes in anterior setigers, long setae may look smooth but they are finely spinulose (Figure 8E).

Posterior end (observed in a paralectotype) with pygidium rugose, without anal cirri. Pharynx not everted. Gut diverticula not seen by transparency, but present along the body (Figure 8F). Some segments have few eggs inside them, each 90–140 μm .

Discussion

Pettibone (1966) stated that this species is conspecific with *P. berkeleyae* Monroe, but both can be recognized using glandular development over the dorsal cirrophore, being superficial and oval-shaped in this species, while in *P. berkeleyae* glands tend to fill the cirrophore and provide a dark color for it. The terms type and cotype should not be used in nomenclature (ICZN 1999, Recomm. 73E); further, the type cannot be regarded as the holotype because it consists of two fragments, which apparently are not coming from the same specimen. One specimen formerly included as part of the cotype is herein being designated as the lectotype; it fits the original description.

Distribution

Restricted to the California current coastal ecosystem.

***Pilargis modesta* Intes and le Loeuff, 1975**

(Figure 9A–E)

Pilargis modesta Intes and le Loeuff 1975, p 299, Figure 8g–k.

Pilargis berkeleyae: Kirkegaard 1983, p 211 (*non* Monroe, 1933).

Pilargis verrucosa: Fauvel 1936, p 25–26; Katzmann et al. 1974, p 16–21, Figures 6, 7 (*partim*: Figures 6B, 7B) (*non* de Saint-Joseph, 1899).

Material examined

Northwestern Africa: holotype (MNHN-A856) of *Pilargis modesta* Intes and le Loeuff, 1975, coll. A. Intes and P. le Loeuff, off Ivory Coast, Stat. TD7 (5°05.4'N, 3°52.8'W), 2 March 1966, 40 m.

Additional material

One complete specimen and a posterior fragment of a mature female (ZMUC-904), Bay of Lobito, Angola, *Galathea* Stat. 120 (12°20'S, 13°40'E), 20 December 1950, 27 m, id. J. B. Kirkegaard (complete 10.6 mm long, 1.3 mm wide, 376 setigers; posterior fragment 4 mm long, 1.5 mm wide, 142 setigers). An anterior fragment (MNHN-A397), off Western Morocco, Stat. 102 (30°40'N, 9°57'W), 16 August 1926, 80 m, id. P. Fauvel (14 mm long, 1 mm wide, 74 setigers; darker than other materials, setigers 30–31 wider, breaking apart).

Redescription

Holotype mature female, colorless, posteriorly incomplete, damaged, breaking in several portions; 38 mm long, 1.1 mm wide, 212 setigers; body breaking apart by setiger 169/170.

Body with many small verrucae over anterior end, less abundant in median segments, almost disappear completely by posterior end. Verrucae smaller, less abundant over parapodial lobes in median and posterior segments.

Prostomium dorsally free from prostomium; palps large biarticulated, directed ventrally. Lateral antennae over anterior prostomial margin; few tiny dark internal spherical structures. Tentacular cirri directed anteroventrally, both of about the same size (Figure 9A).

First setiger with dorsal cirri larger than the one of setiger 2. Parapodia with acuminate, globose dorsal cirri, digitate ventral cirri. Anterior parapodia with large dorsal cirri, about 1.3 times as long as ventral cirri; cirrophore massive with two to three middorsal verrucae, few spherical internal glands, cirrostyles small, about one-fifth as long as cirrophore. Setal lobe rounded with projected acicular lobe (Figure 9C). Median setigers with less abundant verrucae (Figure 9D), often setal lobe deeply invaginated in parapodium; dorsal cirri become larger, 1.5 times longer than ventral ones; size proportions between cirrophore and cirrostyles remain constant posteriorly but glands in cirrophore become more abundant. Posterior parapodia with large ova, each ca. 150 μm (Figure 9E), can be seen in holotype from setiger 87, continue to the end of fragment, more abundant by setiger 200 (Figure 9B). Neurosetae long or short, sometimes curled; few long capillaries, most limbates very finely spinulose, limb almost smooth.

Posterior end (observed in specimens from Angola, ZMUC-904) with one asetiger before pygidial bulb. An inverted truncated cone, distally covered with verrucae; two lateral anal cirri, covered with smaller verrucae. Ova from setiger 87, each about 150 μm .

Discussion

The inclusion of some records of *P. verrucosa* in *P. modesta* was briefly discussed under the latter species. The description of *Pilargis modesta* Intes and le Loeuff (1975) was overlooked by Kirkegaard (1983), who identified his material using the revision by Pettibone (1966). The name was not explained by Intes and le Loeuff; it might indicate the small size of animals, in comparison with *P. berkeleyae*, or more likely the weak development of dorsal verrucae. The original illustration shows very large divergent tentacular cirri but they are actually directed forwards and are rather short. There are two interesting features regarding the verrucae in *P. modesta*: they are linked to the internal layer through a very thin cuticle tunnel, without the internal development seen in other species, and fungiform verrucae are possibly artifacts, as they are not necessarily fixed over a cuticle tunnel. The verrucae in this species are very flat, with a tiny discoid outer layer and a hardly visible thin cuticle tunnel. Further, in two notes related to *P. modesta* (Intes and le Loeuff 1975, p 299; Kirkegaard 1983, p 211), neurosetae were described as spinulose, but all have smooth limb.

Pilargis modesta differs from *P. berkeleyae* in that the former has conical or slightly swollen dorsal cirrophores (two to three times wider than the cirrostyles), and little glandular development, while in *P. berkeleyae* the dorsal cirrophore is globose (four to five times wider than the cirrostyles).

Pilargis sp. Uruguay (Figure 9F)

Pilargis berkeleyae: Salazar-Vallejo and Orensanz 1991, p 274, Figure 3A–C.

Figure 9. (A–E) *Pilargis modesta* Intes and le Loeuff, holotype MNHN-A856: (A) anterior end in dorsal view; (B) posterior segments (205–208) in dorsal view; (C) right setiger 12 in posterior view; (D) right setiger 80 in anterior view; (E) right posterior setiger in anterior view. (F) *Pilargis* sp. Uruguay, right setiger 12 in posterior view. Scale bars: 100 μ m (A); 450 μ m (B); 38 μ m (C–D); 112 μ m (E); 225 μ m (F).

Material examined

Southwestern Atlantic Ocean: one anterior fragment in bad shape (MNHN-1186).

Discussion

It was identified as, and formerly characterized in relation to *P. berkeleyae*, but it does not belong in it. The main difference is that this specimen does not have a large cirrophore nor do the pigmented glands layer in it (Figure 9F). Further, its lower shorter neurosetae are clearly spinulose and spines are large enough to be seen with low magnification ($10\times$), while in *P. berkeleyae* neurosetae are very slightly spinulose. This seems to be an undescribed species, close to *P. modesta*, but different from it by having spinulose neurosetae. More and better material should be gathered in order to propose a new name.

***Pilargis mohri* Gallardo, 1968**

(Figure 10)

Pilargis mohri Gallardo 1968, p 60–61, Plate 12, Figure 8, Plate 13, Figures 1–6.

Type material

Central Western Pacific Ocean: holotype (LANHM-326), RV *Mao Tien*, Stat. 73, 20 January 1960, 9 m, sandy mud, coll. T. N. Loi. Paratype (LACNHM 1861), RV *Stranger*, Stat. 154-2, 24 February 1960, 43 m, mud, coll. T. N. Loi (two fragments; anterior one 29 mm long, 1.0 mm wide, 96 setigers; posterior one, slightly constricted 13 mm long, 0.9 mm wide, 57 setigers).

Redescription

Holotype includes a long anterior, and a posterior fragment; anterior one 96 mm long, 1.0 mm wide, 179 setigers; posterior one 14 mm long, 1.0 mm wide, 33 setigers (plus a few more in regeneration). Body pale, tapered towards anterior and posterior end, slightly wider towards the middle of the body; abundant verrucae. Anterior and posterior ends with verrucae small, diffuse; dorsum with verrucae in three longitudinal bands, two lateral close to parapodial lobes, one mid-dorsal with larger verrucae (Figure 10A). Parapodial lobes with smaller, fewer verrucae, especially on dorsal cirri. Ventral cirri and ventral surface smooth.

Prostomium fused with peristomium. Palps divergent, rounded, palpostyles small rounded (cirriform in paratype). Lateral antennae placed about the middle of the prostomium, rounded, do not reach anterior margin of palps. Tentacular cirri cirriform, dorsal slightly longer and wider than ventral one, tips bent or slightly eroded.

Parapodial lobes short, as long as one-fourth to one-fifth of body width. First dorsal cirri slightly longer than dorsal cirri of setiger 2. Dorsal and ventral cirri fusiform; dorsal cirri one-tenth longer than ventral cirri. Cirrophore not distinct. No glandular material nor pigment spots. Paratype with ventral cirri longer than setal lobe (Figure 10B–E). Dorsal cirrophore with slightly smaller verrucae than those present on the back. Coelom with small eggs. Neurosetae few, very finely spinulose unidentate limbates, and many long smooth capillaries.

Posterior end regenerating about eight setigers; pygidium with verrucae and lateral anal cirri, slightly longer than adjacent verrucae (arranged in three or four concentric rows in paratype). Pharynx completely everted; it has a transparent outer layer with a muscular and glandular core that separate in distal and basal portions. Paratype with gut diverticula present from setiger 4; with small eggs in median and posterior setigers, each about 50 μm .

Figure 10. *Pilargis mohri* Gallardo. (A) Paratype LANHM 1861, posterior fragment in cross-section. (B–E) Holotype LANHM-326: (B) right setiger 20 in anterior view; (C) median right setiger (about 45th) in anterior view; (D) right setiger 49 in anterior view; (E) left setiger 97 in anterior view. Scale bars: 225 μm (A); 112 μm (B–E).

Remarks

Pilargis mohri differs from other species in the genus because it has a definite pattern of verrucae abundance, and parapodia are small, in relation to body width, making it resemble other pilargids with slender bodies, like *Loandalia* Monro.

Distribution

Restricted to the type locality, Southern Vietnam, Western Pacific Ocean.

***Pilargis pacifica* Uschakov, 1955 n. stat.**

Pilargis verrucosa pacifica Zachs 1933, p 128, nomen nudum.

Pilargis verrucosa pacifica Uschakov 1965, p 180–181 (Russian original 1955, p 201), Figure 60A–C₂.

Pilargis berkeleyi Buzhinskaja 1980, p 43–45, Figure 1E–G (*non* Monro, 1933).

Pilargis berkeleyae Buzhinskaja and Britayev 1994, p 95–97, Figure 4A–D (*non* Monro, 1933).

Description (translated and modified from Buzhinskaja and Britayev 1994)

Holotype of *P. v. pacifica* drab yellow, densely verrucose, including prostomium, palps, and cirri; it is 82 mm long, 2.5 mm wide including parapodia, ca. 350 segments.

Prostomium divided in three parts: two lateral lobes and one small triangular lobe. Small antennae are attached to the distal ends of the paired lobes. Palps fused to each other, separated medially for less than half their length; palpophore massive, palpostyle small. Lateral pigmented spots visible in prostomium. Tentacular segment larger than following segments, ciliated areas on its dorsal posterior part. Tentacular cirri similar in length, ventral ones slightly thinner. First pair of dorsal cirri longer than the rest.

Parapodia with dorsal side covered by large glandular areas, each with small dark pigment cells. Dorsal cirri about twice as wide as cirrostyle. All setae bidentate, shaft with row of teeth; bidentate tips in longer setae only seen under high magnification. Anal cirri lost. Living worms from Vostok Bay with pink spotty body; mature male greenish with parapodial bases greenish yellow spots. Preserved specimens with small brown spots especially dorsally, prostomium, palps, and tentacular segment spotty. One specimen from Vostok Bay with two anal cirri.

Remarks

With specimens from Northern Japan, Zachs (1933) introduced the new name as a subspecies. He gave as its distinguishing feature the lack of furcate setae that had been repeatedly included for the stem species (Fauvel 1920, 1923, 1934, 1936). As stated above, these setae are not present in the genus, so their differences have to be revised. Further, *Pilargis verrucosa pacifica* Zachs, 1933, is a *nomen nudum* after ICZN Art. 13 (ICZN 1999), and thus unavailable. The use by Uschakov in 1955 (Uschakov 1965) implies that it should be cited as *Pilargis verrucosa pacifica* Uschakov, 1955 (ICZN Art. 50.1). However, he failed to indicate the re-establishment of the name, or if he had used the same type materials.

Pilargis pacifica Uschakov, 1955 n. stat. differs from *P. verrucosa* by having foliose tentacular and dorsal cirri and smaller verrucae over the body, while *P. verrucosa* has blunt

tentacular and dorsal cirri, and larger verrucae over the body. These differences are regarded as sufficient to change its rank.

Buzhinskaja (1980, p 43) recorded *P. berkeleyae* for the Japan Sea; she overlooked the previous papers (Zachs 1933; Uschakov 1965), which were using *P. v. pacifica*. Later, Buzhinskaja and Britayev (1994, p 95) found in the Vostok Bay what they regarded as the same species; they redescribed the type material of *P. v. pacifica* available in St Petersburg, and concluded that it was a junior synonym of *P. berkeleyae*. They regarded Zachs' name as a junior synonym because his paper was published after Monro's and because they found no differences after comparing it with the redescription by Hartman (1947). By comparing those illustrations, however, there are several differences between these two species: *P. pacifica* has a large tentacular segment, as wide as setiger 1, while in *P. berkeleyae* it is narrower than setiger 1; the dorsal cirri in *P. pacifica* have cirrostyles slightly thinner than cirrophores, while they are markedly thinner in *P. berkeleyae*; and in *P. pacifica* setal lobes are elongate triangular, while they are short truncate in *P. berkeleyae*. Therefore, they cannot be synonyms.

In fact, after the available morphological and ecological information available (Imajima 1987; Britayev 1993), there may be more than one species in the Northwestern Pacific. The relationships among these species have to be based on the revision of materials which were not available to us.

***Pilargis papillata* Rasmussen, 1973**

(Figure 11)

Pilargis papillata Rasmussen 1973, p 20–22, Figure 2.

Type material

Northeastern Atlantic Ocean: holotype (ZMUB-53527), Fensfjorden NE for Gardsenflu (60°49'N, 5°03'42'E), Norway, 412 m, coll. K. Rasmussen. Complete animal; two (not three) paratypes (ZMUB-53528), Fensfjorden, NE for Gardsenflu, Norway, 580–412 m, coll. and id. K. Rasmussen (dried out; anterior fragment 14.5 mm long, 1.0 mm wide, 73 setigers; posterior fragment with eight setigers).

Redescription

Holotype (ZMUB-53527) complete, twisted over itself, making difficult any measurement without further damaging it. It was described as 20 mm long (it is 5.7 mm long), 1.0 mm wide (setiger 15), 80 setigers and a regenerating posterior end with eight or nine asetigers; it has 26 setigers and a regenerating portion with two immature setigers and three preanal asetigers. It is now colorless but the posterior brain lobes are dark (occupy first setiger and slightly invade the second one). Body flat, densely covered by verrucae dorsally, verrucae abundant over tentacular and dorsal cirri (Figure 11A). Ventrally verrucae restricted to parapodial bases, smaller, leaving a smooth midventral wide area limited by two longitudinal muscle bands. Left setigers 7–10 are folded dorsally (because of body compression in the vial).

Prostomium completely fused dorsally to peristomium; palps biarticulate, palpostyles central, directed ventrally. Lateral antennae wide, densely covered with verrucae, placed anteriorly, slightly surpass prostomial anterior margin (Figure 11B, C). Tentacular cirri cirriform, directed anteriorly, dorsal ones slightly larger than the ventral.

First setiger with dorsal cirri globose, thin, acuminate, slightly longer than dorsal tentacular cirri, slightly shorter than dorsal cirri of second setiger. Anterior parapodia with fusiform cirri with verrucae; dorsal cirri twice as long as ventral cirri, much thicker (Figure 11E). Posterior parapodia with dorsal cirri foliose, larger than setal lobe, separated in cirrophore and cirrostyles (Figure 11F). Cirrophore massive with dense cover of large verrucae, with an anterior small glandular area; cirrostyles digitate with smaller verrucae. Ventral cirri smooth placed basally to the setal lobe and shorter than it. Neurosetae mostly complete; despite adsorpted materials, they are limbates with limb thin, smooth, distally entire (in paratype, most setae broken, some appear distally bidentate).

Posterior end with pygidium in regeneration; damaged (Figure 11D); two setigers and three preanal asetigers. Pygidium as an inverted truncate cone, two ventrolateral anal cirri well developed, with many verrucae. Paratypes with enteric diverticula dark, clearly seen from setiger 15; few eggs can be seen from about setiger 50. Posterior fragment shows them too.

Discussion

The holotype differs in several regards to the original description, besides the difference in size. The original illustration included a ventral view, which was indicated as a dorsal view. The posterior brain lobes are dark, there are two other lateral smaller dark glands projecting towards the posterolateral corners of the tentacular segment, and the pigmented glandular area in posterior cirrophores has faded slightly. The dorsal cirri are larger in median setigers; the second dorsal cirri is not shorter than the first dorsal cirri. The neurosetae are distally entire, not bidentate, and have a thin, smooth blade.

This species belongs to the group with abundant dispersed verrucae over the back and parapodial lobes. *Pilargis papillata* is closely allied to *P. modesta* and *P. rozbaczyloi* n. sp., but differs from them by having the first dorsal cirri smaller than the following ones rather than larger, and fusiform verrucose dorsal cirri, contrasting with digitate verrucose cirri in *P. rozbaczyloi* n. sp., and smooth fusiform cirri in *P. modesta*.

Distribution

Restricted to the type locality in Southwestern Norway in depths of over 400 m.

***Pilargis rozbaczyloi* n. sp.**

(Figures 12, 13)

Pilargis berkeleyae Cañete et al. 1990, p 154–156, Figures 1–5; Rozbaczylo and Quiroga 2002, p 647, Figure 2A, B; ?Dean 1999, p 55–59, Figure 17 (*non* Monro, 1933).

Type material

Southeastern Pacific (Chile): holotype (SSUC-6901), coll. E. Quiroga, November 1997, Mejillones, Antofagasta (23°04'21"S, 70°25'42"W), 46 m. One paratype (SSUC-6902), coll. E. Quiroga, March 1998, Mejillones, Antofagasta (23°04'24"S, 70°25'32"W), 68 m. One paratype (SSUC-6903), coll. C. Osorio, November 2001, Lota (37°04'16"S, 73°11'01"W), 27 m. One paratype (SSUC-6904), coll. C. Osorio, November 2001, Lota (37°04'19"S, 73°10'49"W), 25 m. One paratype (SSUC-6906), coll. C. Osorio, November 2001, Lota (36°43'48"S, 73°09'44"W), 35.7 m.

Figure 11. *Pilargis papillata* Rasmussen, holotype ZMUB-53527. (A) Anterior end in dorsal view; (B) same, enlargement of the anterior end; (C) same, anterior end in ventral view; (D) posterior end in ventral view; (E) left setiger 12 in posterior view; (F) median right setiger in anterior view (insert: verruca profile, enlarged). Scale bars: 175 μm (A, C, D); 90 μm (B, E, F).

Description

Holotype (SSUC-6901) complete, slightly dark colored, dark glands placed basally, over anterior side of dorsal cirrophore, few ventral glands on parapodial ventral side. Verrucae coarse, widespread over the body. Body 22 mm long, 2.5 mm wide, 98 setigers, three asetigers. Several darker spots over anterior end. Two large dark masses in the base of tentacular cirri, two other ones placed more towards the middorsal line, and brain posterior lobes clearly darker than the rest of the brain.

Prostomium dorsally free from peristomium; palps biarticulated, palpostyles small rounded, directed ventrally. Lateral antennae placed anteriorly (Figure 12A). Tentacular segment with two tentacular cirri, dorsal slightly wider than the ventral, directed laterally.

First setiger with dorsal cirri as long as dorsal tentacular cirri, longer than dorsal cirri of setiger 2. Anterior setigers with dorsal and ventral cirri elongated, cirrostyles about as long as ventral cirri (Figure 13A); glands scattered. Median parapodia with notocirri thicker than neurocirri, of about the same length; cirrostyles shorter than in anterior setigers (Figure 13B), verrucae over dorsal surface of parapodial lobe (Figure 13E); glands become more abundant and closely packed. Posterior parapodia with dorsal cirrostyles 1.5 times as long as ventral cirri; glands few, some ventral ones aligned along the base of parapodia (Figure 13D).

Parapodial glands well developed, a rounded basal group over the anterior face of dorsal cirrophore, and two other glands placed over ventral surface; present in setigers 9–98 but better developed by setiger 50. Glands in median segments with pigment diffuse, better developed in notopodial base, and ventrally along parapodial base; additional glands smaller, diffuse (Figure 13C). Neurosetae of two types, capillaries long or short, limbates denticulated, distally curved, bidentate (Figure 13F).

Posterior end abruptly tapered giving the appearance of being regenerated; pygidial bulb well developed, as long as previous four asetigers, covered with coarse verrucae over the distal margin and with a proximal, slender almost smooth surface. Two ventrolateral anal cirri covered by truncated verrucae (Figure 12B). Two paratypes had different pygidia; one had a non-expanded anal bulb with two verrucate anal cirri (Figure 12C), while another one lacked anal cirri and distal expansion, but the verrucae had a similar abundance (Figure 12D).

Discussion

Pilargis rozbaczyloi n. sp. resembles *P. berkeleyae*; they differ because in *P. berkeleyae* verrucae are generally small, restricted to the anterior end and parapodial lobes, the cirrophore is much larger than the cirrostyles, and the glandular region on cirrophores is massive. Cañete et al. (1990) material was not available; their illustrations and description are good enough to be confident about the identity of their materials. The development of gland areas in *P. rozbaczyloi* n. sp. resembles *P. maculata*, being restricted to the anterior side of the cirrophore, but verrucae are larger in the former, and both differ from *P. berkeleyae* because its glands tend to cover the whole cirrophore. The single specimen found by Dean (1999) might belong to this species.

Etymology

The species is named after Nicolás Rozbaczylo because of his important work and publications on Chilean polychaetes, and for helping to make this material available.

Figure 12. *Pilargis rozbaczyloi* n. sp. (A, B) Holotype SSUC-6901: (A) anterior end in dorsal view; (B) same, posterior end in dorsal view. (C) Paratype SSUC-6904, posterior end in dorsal view. (D) Paratype SSUC-6903, posterior end in dorsal view. Scale bars: 225 μm.

Type locality

Off Antofagasta, Chile, among mussels, 46 m depth.

Distribution

Northern and Central Chile in 25–70 m water depth.

Pilargis tardigrada (Webster, 1879)

Phronia tardigrada Webster 1879, p 268–269, Plate 11, Figures 158–163.

Pilargis tardigrada Pettibone 1966, p 161 (key).

Description

Body very long, with 320 setigers. Prostomium separated from peristomium; palps biarticulated, directed ventrally, palpostyles small digitate, slightly larger than verrucae. Tentacular cirri unequal, dorsal one about five times as long as ventral cirri.

Figure 13. *Pilargis rozbaczyloi* n. sp. (A, B) Holotype SSUC-6901: (A) right setiger 12 in anterior view; (B) same, right setiger 45 in anterior view. (C, D) Paratype SSUC-6902: (C) right setiger 45 in anterior view (insert: glands, enlarged); (D) same, right setiger 90 in anterior view (insert: glands, enlarged). (E, F) Paratype SSUC-6906: (E) right setiger 50 in posterior view; (F) same, neurosetae with tip eroded. Scale bars: 150 μ m (A); 112 μ m (B); 180 μ m (C, E); 225 μ m (D); 34 μ m (F).

First setiger with dorsal cirri twice as long as those of setiger 2. All setigers with globose dorsal cirri, tapering, larger than ventral cirri; glands small on anterior parapodia. Size of glands in median and posterior setigers similar (after the original drawings). Verrucae apparently restricted to dorsal cirri.

Parapodial glands dark, short, dispersed throughout the cirrophore. Neurosetae long or short capillaries and limbates, limbus unknown, distally curved, tip unknown. Posterior end unknown.

Remarks

The original illustration shows very large dorsal tentacular cirri and dorsal cirri of setiger 1. In fact, this has been used to separate the species from the others (Pettibone 1966). *Pilargis tardigrada* is closely allied to *P. maculata*; they differ because in *P. tardigrada* dorsal cirrostyles are fusiform and notopodial glands are dispersed, while in *P. maculata* dorsal cirrostyles are digitiform and glands are concentrated over the anterior notopodial face.

***Pilargis wolfi* n. sp.**

(Figure 14)

Pilargis sp. A Wolf 1984, p 29.28, Figures 29.25, 26a–d.

Type material

Gulf of Mexico: Florida, USA: holotype (USNM 86960) and one paratype (USNM), off Apalachicola River, MAFLA Stat. IV-2423 (29°37'01"N, 84°17'00"W), 19 m. Texas, USA: one specimen (paratype) (USNM 86962), STOCS Stat. III-4 (26°58'N, 97°20'W), 15 m.

Description

Holotype complete, pale, twisted, dark glands placed basally on anterior surface of dorsal cirrophore, few ventral glands on parapodial ventral side. Verrucae coarse, over all dorsal surface. It is 17 mm long, 0.8 mm wide, 104 setigers, four asetigers.

Prostomium separated from peristomium; palps biarticulated, directed ventrally, palpostyles small rounded, covered with large verrucae (Figure 14A). Tentacular segment with two subequal tentacular cirri directed anteriorly, dorsal pair with large verrucae.

First setiger with dorsal cirri about as long as dorsal cirri of setiger 2. All setigers with globose dorsal cirri, acuminate, larger than ventral cirri; glands small on anterior parapodia (Figure 14B), become larger in median ones (Figure 14E), less developed in posterior setigers (Figure 14F). Verrucae present over the parapodia and on ventral surface, larger by median setigers, reduce its size towards posterior end.

Parapodial glands dark, well developed in an elliptic basal group over anterior surface of dorsal cirrophores, two other smaller ones over ventral surface. Start by setiger 5, become larger and more abundant by setiger 10. By setiger 20, become twice as big as anterior glands; by setiger 50, fade out almost completely (Figure 14C). Neurosetae long or short capillaries and limbates, limbus denticulated, distally curved, entire.

Posterior end tapers towards a non-swollen pygidial bulb, with large verrucae; two ventrolateral anal cirri provided with smaller verrucae (Figure 14D). Brain posterior lobes reach setiger 1. Enteric caeca from setiger 2.

Discussion

Pilargis wolfi n. sp. resembles *P. modesta* by having non-conspicuous dorsal verrucae but it differs by having well-developed verrucae over median and posterior parapodia. It has a pigmented glandular pattern similar to that found in *P. maculata* and *P. rozbaczyloi* n. sp.; it differs from the former by having longer cirrostyles and larger verrucae in median and posterior segments, while from the latter it differs by having a short cirrophore and especially by lacking anterior pigmented glands over posterior setigers.

Figure 14. *Pilargis wolfi* n. sp. (A–C) Holotype USNM-86962: (A) anterior end in dorsal view; (B) same, right setiger 12 in anterior view; (C) same, right setiger 44 in anterior view. (D–F) Paratype USNM-86960: (D) posterior end in dorsal view, slightly twisted; (E) same, right setiger 40 in anterior view; (F) same, right setiger 93 in anterior view. Scale bars: 225 μ m (A); 90 μ m (B, C); 112 μ m (D); 225 μ m (E); 90 μ m (F).

Etymology

This species is named after Dr. Paul S. Wolf, who was an important collaborator on the *Taxonomic Guide to the Polychaetes of the Northern Gulf of Mexico*, and because of his important publications on pilargid polychaetes.

Type locality

Off Texas, USA.

Distribution

Northern Gulf of Mexico (Texas–Florida), 15–19 m.

Pilargis* sp. n. SwedenMaterial examined*

One median fragment (ECOSUR) heavily contracted, Singlefjord, Sweden, coll. legit F. Pleijel, 18 February 1986, 70–100 m.

It is about 6 mm long, 1.2 mm wide, 28 setigers. Verrucae about the same size over the dorsum, conical, mammiliform, or 8-shaped. Those present over dorsal cirri larger over dorsal side, not much smaller than those over cirrophore. Parapodia directed dorsally because of distortion. Dorsal cirri with acuminate cirrostyles, squat cirrophore, the cirrostyle 1.5 times longer than cirrophore. Setal lobe triangular. Ventral cirri digitate slightly longer than setal lobe. All neurosetae smooth capillaries.

Discussion

This fragment does not fit into *P. papillata* Rasmussen, which has been described from a fjord environment, and it might be an undescribed species. It differs by having many verrucae with an 8-shaped profile, that are abundant and large over cirrostyles, and by having all setae capillaries. More and better material is required to describe the species.

Key to species of *Pilargis* de Saint-Joseph, 1899

1. Dorsal verrucae distributed throughout body 2
- Dorsal verrucae restricted to anterior end and parapodia 6
- 2(1) Median segments with verrucae arranged in three longitudinal bands *P. mohri* Gallardo, 1968 (Vietnam)
- Median segments with dispersed verrucae, not arranged in bands 3
- 3(2) Dorsal cirrophore larger than cirrostyles 4
- Dorsal cirrophore much larger than cirrostyles; dorsal cirri much larger than ventral cirri *P. cholae* n. sp. (Grand Caribbean region)
- Dorsal cirrophore about as long as the cirrostyles; dorsal cirri larger than ventral cirri *P. verrucosa* de Saint-Joseph, 1899 (Eastern France and Mediterranean Sea)

- Dorsal cirrophore indistinct; dorsal cirri larger than ventral cirri
. *P. pacifica* Uschakov, 1955 (Japan Sea)
- 4(3) First dorsal cirri smaller than following ones
. *P. papillata* Rasmussen, 1973 (Western Norway)
- First dorsal cirri larger than following ones 5
- 5(4) Verrucae small; notopodial glands internal
. *P. modesta* Intes and le Loeuff, 1975 (Northwestern Africa and Western
Mediterranean Sea)
- Verrucae large; notopodial glands restricted to its anterior surface
. *P. rozbaczyloi* n. sp. (Central Chile)
- 6(1) Verrucae medium sized; dorsal cirrophore smaller than cirrostyles
. *P. wolffi* n. sp. (Northern Gulf of Mexico)
- Verrucae small 7
- 7(6) First dorsal cirri as long as following ones; dorsal cirrophore smaller than
cirrostyles; notopodial glands not seen
. *P. angeli* n. sp. (Northeastern Pacific Ocean)
- First dorsal cirri longer than following ones 8
- 8(7) Dorsal cirrophore larger than cirrostyles 9
- Dorsal cirrophore as long as cirrostyles 10
- 9(8) Median setigers with cirrophore smooth, with many large internal glands
. *P. berkeleyae* Monro, 1933 (California)
- Median setigers with cirrophore verrucose, with small internal glands
. *P. modesta* Intes and le Loeuff, 1975 (Northwestern Africa)
- 10(8) Dorsal cirrostyles fusiform; median setigers with ventral cirri longer than setal
lobe; notopodia with dispersed pigmented glands
. *Pilargis tardigrada* (Webster, 1879) (Northwestern Atlantic Ocean)
- Dorsal cirrostyles digitiform; median setigers with ventral cirri shorter than setal
lobe; notopodia with glands over its anterior face
. *P. maculata* Hartman, 1947 (California)

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